

PATENT SPECIFICATION

DRAWINGS ATTACHED

Inventor: ERWIN EDWARD SPORK

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COMPLETE SPECIFICATION

Improvements in and Connected with Carriers for Sliding Doors

We, CENTOR PRODUCTS PTY LTD., a company incorporated under the laws of the State of Queensland, Australia, of 997—1001 Kingsford-Smith Drive, Eagle Farm, Brisbane, Queensland, Australia, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

THIS INVENTION relates to improvements in and connected with carriers for sliding doors, and it has more particular reference, primarily, to improved height-adjustment means for the carriers of sliding doors.

The principal object of the invention is to provide such improvements in a carrier for a sliding door that the effective distance between the attachment of the door to the carrier and the position of engagement of the carrier roller or rollers with a mounting track may be quickly and easily varied within fine adjustment limits.

Another object of the invention is to provide improvements of the aforementioned nature which will permit of the adjustment being conveniently effected in any desired location and without interference from adjacent or ancillary fittings.

A further object of the invention is to provide improved door-attachment or mounting means for a carrier for a folding and sliding door which will ensure greater rigidity of the door relative to the carrier while permitting easy attachment and adequate pivotal movement for the folding action.

Other objects of the invention are to provide carriers incorporating the aforementioned improvements and of such construction that they may be simply and inexpensively manufactured, may be easily fitted to the relevant types of doors, and will prove strong, durable and efficient in operation.

With the foregoing and other objects in view, the invention resides broadly in a carrier for a sliding door, including a door-attachment plate adapted to be disposed vertically and having means for affixing it to a door, a roller-mounting plate adapted to be mounted vertically adjacent and parallel to the door-attachment plate and having one or more horizontal axles for rollers adapted to engage a door-mounting track, crank means interconnecting the two plates and including a crank rod closely rotatable in an aperture in the door-attachment plate but otherwise fixed relative to the door-attachment plate, rotation of the crank rod acting to cause relative sliding movement between the plates and a change in the level of the or each axle relative to the door-attachment plate, means whereby the crank rod may be manually rotated and means for locking the plates in desired adjusted attitudes.

In order that the invention may be more readily understood and put into practical effect, reference will now be made to the accompanying drawings, wherein:—

Fig. 1 is a perspective view of one type of carrier in accordance with the invention, shown mounted on a sliding door track and having the upper end of a sliding and folding door secured thereto;

Fig. 2 is an elevational view of the carrier shown in Fig. 1, viewed from the roller side or inner side;

Fig. 3 is a plan view of the carrier shown in Fig. 2;

Fig. 4 is a sectional end view along the line 4—4 of Fig. 2;

Fig. 5 is a perspective view from the inner side of another form of carrier in accordance with the invention, and

Fig. 6 is a perspective view of the other side of the carrier shown in Fig. 5, the parts being shown in separated relationship.

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Referring initially to Figs. 1 to 4 of the drawings, there is shown a carrier for supporting a sliding and folding door, this carrier having a substantially rectangular door-attachment plate 10 adapted to be disposed vertically and having a semi-circular door-mounting plate 11 formed integrally therewith at right angles thereto so that it may lie horizontally parallel to and across the upper edge of the door 12. The upper edge of the door is indicated by the numeral 13 in Fig. 2, while the sides of the door are indicated by the numeral 14 in Fig. 3. The door-mounting plate 11 is provided with a central countersunk hole 15 in order that the head 16 of a conical-headed bolt 17 may be set therein without upward protrusion, the bolt 17 being used for stable yet pivotal attachment of the door 12 as hereinafter described.

The vertical door-attachment plate 10 is substantially rectangular with a large vertical middle projection 18 of slightly more than a semi-circle having a central round aperture 19 therein, while at each end of the plate 10 there is a smaller vertical projection 20 having a vertical slot 21.

The carrier also includes a roller-mounting plate 22 which is rectangular and of the same length as the door-attachment plate 10, and it is adapted to lie against the vertical plate 10 on the inner side adjacent the door track. There are provided two stub axles 23 which extend horizontally, and fixedly from the roller-mounting plate 22 at the same height and both on the inner side thereof at equal distances from the central aperture 19, the axles 23 thus being parallel to one another in a direction across the door-mounting plate 11 and top of the door 12. The stub axles 23 are of reduced diameter at their free ends and have circumferential grooves (not shown) within which circlips 24 may be engaged to hold thereon suitable wheel-type rollers 25 having ball-races interposed between the rims and axles in known manner. These rollers 25 are adapted to engage in any suitable type of grooved longitudinal door track, such as that indicated at 26 in Fig. 1, the door 12 being adapted to lie directly beneath the track 26 as will be apparent from Fig. 3.

Midway between the roller axles 23, there is provided in the roller-mounting plate 22 a horizontally-elongated slot or aperture 27 which is rounded at its ends, as illustrated, and the two apertures 19 and 27 house an eccentric which includes a circular eccentric disc 28 at the inner end of an eccentric-screw 29, the disc 28 being offset so that its axis is spaced from but parallel to the axis of the screw 29. The eccentric-screw 29 fits closely but rotatably through the aperture 19, while the eccentric-disc 28 fits in the horizontally-elongated slot 27, the height of the slot

27 being very slightly greater than the diameter of the disc 28 while the length of the slot is very slightly greater than the outside diameter of the circle traced out by the disc 28 when the latter rotates about the axis of the screw 29. The outer end of the eccentric-screw 29 is provided with a diagonal slot 30 for engagement by a screw-driver or the like whereby the screw 29 may be rotated for adjustment purposes, while the screw 29 is also provided with a locking nut 31 adapted to be tightened to hold the door-attachment plate 10 securely between the nut 31 and the eccentric-disc 28 so that the eccentric will be locked in a set position when adjustment is not required to be made.

The aforementioned vertical slots 21 form part of plate-locking and guide means, and for this purpose, there is provided at each end of the door-attachment plate 10 a locking screw 32 having its head adapted to bear against the outer face of the plate 10, its shank passing closely through the plate 10 and then engaging in a tapped aperture 33 in the roller-mounting plate 22.

To adjust the height of the door 12 relative to the rollers 25, vertical sliding movement of the roller-mounting plate 22 relative to the door-mounting plate 10 is necessary, and this is effected by firstly loosening the side screws 32, it being appreciated that the shanks of these screws may then move in vertically guided manner in the slots 21 with-cut horizontal movement in the plane of either plate 10 or 22. The nut 31 for the eccentric is then also loosened, whereafter the eccentric-screw 29 may be rotated by a screw-driver so that the eccentric-disc 28 will rotate in the elongated eccentric-slot 27 to vary the position of the plate 22 relative to the plate 10. It will be appreciated that the horizontal elongation of the slot 27 caters for the crank action of the eccentric and allows relative vertical movement even though the screws 32 prevent longitudinal or sideways movement. In this manner, accurate and fine adjustment may be made from the outer side of the fitting after the door has been hung in required position, without interference by adjacent or ancillary fittings. When the required adjustment has been made, the side screws 32 and the locking nut 31 are tightened to ensure that no further relative movement between the plates 10 and 22 will occur.

As a further feature of the invention, I provide improved means for obtaining greater stability in the mounting of the sliding and folding door on the door-mounting plate 11 of the carrier, the door 12 being connected to the plate 11 for pivotal movement about the axis of the bolt 17 previously mentioned. For this purpose, I provide a cast bearing plate 34 of less width than the door and elongated longitudinally with rounded ends,

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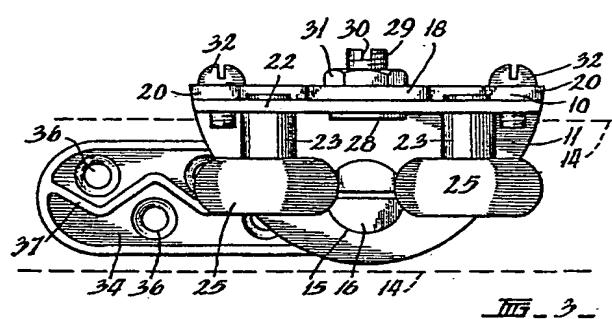
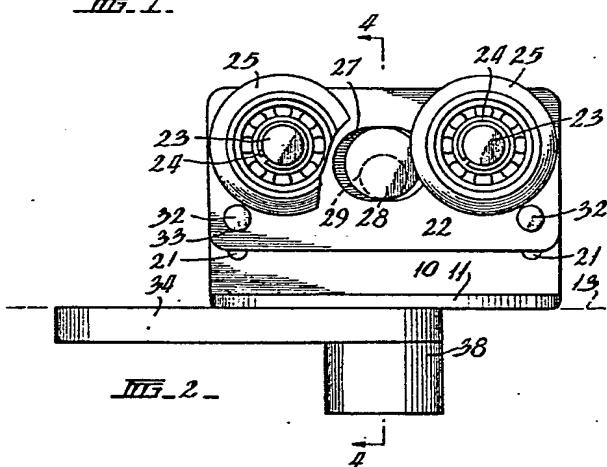
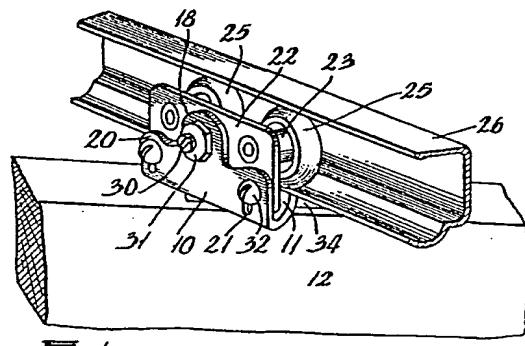
- being adapted to fit closely within a corresponding groove or recess (not shown) in the upper edge or top of the door. The pivot bolt 17 passes closely but freely through an aperture 35, Figure 4, at one end of the bearing plate 34, while the remainder of the plate has screw holes 36 whereby it may be secured within the recess in the door. For economy and efficiency, the plate 34 is cast with a recessed upper side having a zig-zag longitudinal partition 37 defining compartments, as illustrated, which each houses a countersunk screw hole 36 for the attachment to the door.
- Beneath the end of the plate 34 having the aperture 35 through which the pivot bolt 17 passes rotatably, there is provided a cylindrical locating nut 38 which is adapted to fit closely within a corresponding hole in the top of the door for the purpose of stability. The locating nut 38 is tapped for the upper part of its length at 39 to engage screw-threadedly on the lower end of the pivot bolt 17, and its lower end is then bored to a greater diameter to allow the insertion of a lock nut 40 which may be engaged over the lower extremity of the pivot bolt 17 to bear against the shoulder at the junction of the tapped part 39 with the larger bore of the locating nut 38, the nut 40 being welded to the locating nut 38 if so desired. In this manner, the bearing plate 34 will be held firmly but pivotally between the door-mounting plate 11 and locating nut 38. As the bearing plate 34 is rigid with the door and the locating nut 38 is also fitted closely within its aperture in the door, the assembly will have excellent rigidity and still enable desired pivoting of the door relative to the carrier.
- The further form of the invention shown in Figs. 5 and 6 is a simple type of carrier for a door which slides only without folding. In this case, the vertical door-attachment plate 10a has a horizontal door-mounting plate 11a of rectangular form at right angles thereto and adapted to be fixed along the top of a door by the engagement of suitable fasteners, such as screws, with attachment and adjustment slots 41.
- There is provided a roller-mounting plate 22a of disc-like form adapted to lie vertically against the inner face of the door-attachment plate 10a, and the plate 22a has an integral axial axle 23a upon which is rotatably mounted on ball bearings a roller 25a of larger diameter than the disc-like plate 22a, the roller 25a being adapted to engage any suitable form of track as will be apparent.
- On the outer face of the roller-mounting plate 22a opposite the roller 25a there is an integral crank screw 29a having its axis spaced from but parallel to the axis of the axle 23a. The crank screw 29a is passed closely but rotatably through an aperture 19a in the door-attachment plate 10a and it is externally threaded so that a locking nut 31a is secured thereon so that the plate 10a is clamped between the disc-like roller mounting plate 22a and the nut 31a. When the nut 31a is loosened or slackened, the crank screw 29a can be rotated by engagement of a screwdriver or the like with a diametral slot 30a at the outer end of the crank screw 29a.
- The operation of this form of the invention will be similar to that previously described except that the relative vertical movement between the plates 10a and 22a is obtained by a cranked or arcuate motion, the relative lateral movement not being prevented as in the first embodiment. Additionally, the locking of the screw 29a by the nut 31a is the only means for securing the plates 10a and 22a against relative movement.
- While carriers for folding and/or sliding doors as described and illustrated will be found very effective in achieving the objects for which the invention has been devised, it will be understood that these exemplary forms of the invention may be subject to many further modifications of constructional detail and design. Then again, any suitable type of door track may be used, with one or more rollers arranged on the roller mounting plate other than as aforementioned, while other types of attachment means may be employed for securing the carriers to either a simple sliding door or to a sliding and folding door. All such modifications will be readily apparent and are deemed to reside within the scope and ambit of my invention, as defined by the appended claims.
- WHAT WE CLAIM IS:—**
1. A carrier for a sliding door, including a door-attachment plate adapted to be disposed vertically and having means for affixing it to a door, a roller-mounting plate adapted to be mounted vertically adjacent and parallel to the door-attachment plate and having one or more horizontal axles for rollers adapted to engage a door-mounting track, crank means interconnecting the two plates and including a crank rod closely rotatable in an aperture in the door-attachment plate but otherwise fixed relative to the door-attachment plate, rotation of the crank rod acting to cause relative sliding movement between the plates and a change in the level of the or each axle relative to the door-attachment plate, means whereby the crank rod may be manually rotated and means for locking the plates in desired adjusted attitudes.
 2. A carrier for a sliding door, according to claim 1, wherein the crank rod is so made and arranged that the two plates may be permitted relative vertical sliding movement without relative lateral sliding movement and wherein vertical guide means are associated with the two plates and are adapted to permit relative vertical sliding movement of the

- plates, but prevent relative lateral movement.
3. A carrier for a sliding door, according to claim 2, wherein the plate-locking means include at each end of the plates a locking screw having its head engaging on the outer side of the outer plate remote from the rollers while its shank passes closely but freely through a vertical slot in the said outer plate and engages in a tapped hole in the inner plate, the said vertical slots constituting the said guide means.
4. A carrier for a sliding door, according to any one of the preceding claims, wherein an eccentric consists of a circular eccentric-disc secured to one end of the crank rod in off-set relationship so that the axes of the disc and rod are spaced but parallel, the eccentric-disc being located in an aperture in the other plate which aperture is horizontally elongated in such manner that its height is very slightly more than the diameter of the eccentric-disc while its length is greater than the outside diameter of the circle traced out by the eccentric-disc when it is rotated about the axis of the rod.
5. A carrier for a sliding door, according to any one of the preceding claims, including a pair of rollers at the same height on the same side of the roller-mounting plate.
6. A carrier for a sliding door, according to claims 4 and 5, wherein the eccentric is located between the rollers.
7. A carrier for a sliding door, according to claim 1, including a single roller mounted on a horizontal axis on the roller-mounting plate, and wherein the crank rod is fixed at one end to the roller-mounting plate on the opposite side thereof to the horizontal axle and has its axis in spaced parallel relationship to the axis of the axle.
8. A carrier for a sliding door, according to claim 7, wherein the roller-mounting plate is of disc-like form with the axle disposed axially thereon.
9. A carrier for a sliding door, according to claim 3 or 7 or any claim when appendant thereto, wherein the means whereby the rod may be rotated comprises a diametral slot in the other end of the rod adapted to be engaged by a screw-driver or the like.
10. A carrier for a sliding door, according to claim 3 or 7 or any claim when appendant thereto, wherein the rod is externally threaded and is provided on its other end with a nut constituting the locking means.
11. A carrier for a sliding door, according to any one of the preceding claims, wherein the means for affixing the door-attachment plate to a door includes a substantially horizontal mounting plate formed integrally with the door-attachment plate and adapted to be connected to the upper edge of the door to lie parallel thereto.
12. A carrier for a sliding and folding door, according to claim 11, wherein the substantially horizontal mounting plate of the door-attachment plate is adapted to lie against or adjacent the upper edge of the door and includes an aperture in the mounting plate a vertical pivot bolt passing down through the aperture and through a corresponding aperture in a bearing plate adapted to be secured to the upper edge of the door or within a groove therein, and an elongated locating nut secured threadedly to the lower end of the pivot bolt and adapted to engage in a hole in the door.
13. A carrier for a sliding and folding door, according to claim 12, wherein the elongated locating nut is cylindrical for close engagement in a cylindrical hole in the upper edge of the door for stabilising purposes.
14. A carrier for a sliding and folding door, according to claim 12 or 13, wherein the locating nut is tapped at its upper end for engagement by the threaded pivot bolt and is bored at its lower end to a larger internal diameter to accommodate a lock nut engaging on the lower threaded end of the pivot bolt and bearing upwards against a shoulder at the junction of the larger bore with the tapped upper end of the locating nut.
15. A carrier for a sliding and folding door, substantially as hereinbefore described with reference to and illustrated in Figures 1 to 4 of the accompanying drawings.
16. A carrier for a sliding door, substantially as hereinbefore described with reference to and illustrated in Figures 5 and 6 of the accompanying drawings.

FORRESTER, KETLEY & CO.,
Chartered Patent Agents,

Jessel Chambers, 88-90 Chancery Lane,
London W.C.2.

and
Central House, 75 New Street,
Birmingham 2.
Agents for the Applicant.



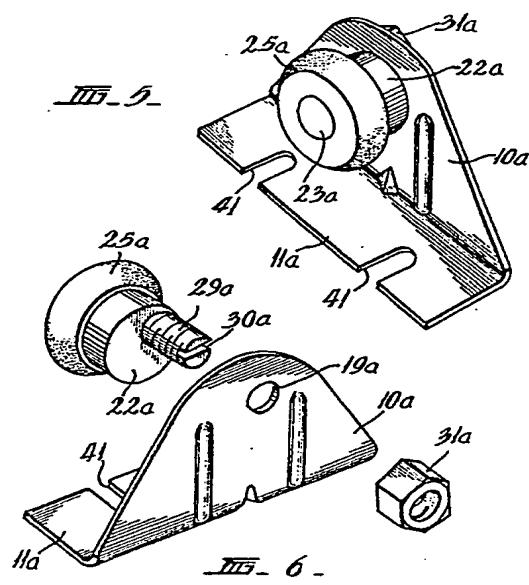
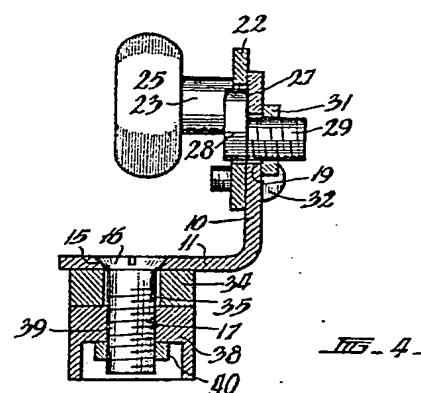
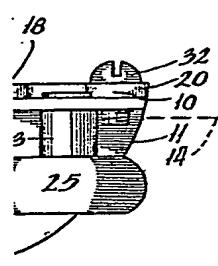
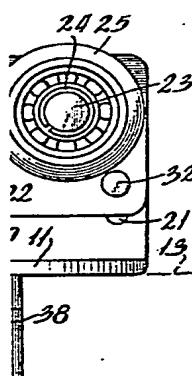
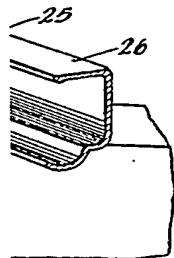
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